

## Scientific Note

### ***EULIMNADIA TEXANA* PACKARD 1871 (CONCHOSTRACA: CRUSTACEA) FROM NORTHERN CALIFORNIA: ANTHROPOGENIC INTRODUCTION?**

*Eulimnadia texana* Packard is a clam shrimp reported from seasonal pools and playas. It has been found during summer months in Arizona, California, Colorado, Florida, Kansas, Louisiana, Missouri, Nebraska, Nevada, Oklahoma, Texas, and Utah (Pennak, R. W. 1989. Fresh-water Invertebrates of the United States, 3rd ed. John Wiley and Sons. New York, New York; Sassaman, C. 1989. Bull. Marine Sci. 42: 425–432). I commonly encounter *E. texana* as well as *Leptestheria compleximanus* (Packard, 1883) and *Caenestheriella setosa* (Pearse, 1912), in playas and rain pools in the Mojave and Colorado deserts of southern California and Nevada during the summer. These desert habitats are inundated by summer monsoonal rains that come north from Arizona typically during July through September.

I collected *E. texana* from two locations in Palo Cedro, Shasta County, California, U.S.A. in the northern end of the Central Valley in September 1991, approximately 800 km from the northern most previously reported locations west of the Rocky Mountains. The first site was an agricultural ditch that was draining a flood irrigated alfalfa field between Deschutes Road and Cow Creek, approximately 5.6 km south of Highway 44. The ditch has a partial canopy of oak (*Quercus* sp.) and was bordered in places by Himalayan blackberry (*Rubrus discolor* Weihe and Nees), but otherwise was devoid of living vegetation.

The second collection was made from an artificial pool, dug into the remains of a seasonal drainage adjacent to Spanish Oaks Drive on the east side of Cow Creek, about 0.4 km south of Highway 44. This pool had been inundated by sprinkler run-off from a near-by golf course. The run-off had entered the local drainage to the artificial pool, which has a partial canopy of oak and pine (*Pinus* sp.), and had dallis grass (*Paspalum* sp.) in clumps around the margin.

I returned to these locations in August 1993 and found *E. texana* only in the irrigation ditch. Subsequent visits to both locations in September and October of 1994, and 1998, did not yield any more *E. texana*. Specimens were deposited at the Bohart Museum of Entomology, University of California, Davis.

The California Central Valley typically does not have summer precipitation: the normal rainy season is during the winter months from November through April when air temperatures range from  $-23^{\circ}\text{C}$  to  $18^{\circ}\text{C}$ . Optimal hatching temperatures of water for *E. texana* are between  $20^{\circ}$  and  $25^{\circ}\text{C}$  (Belk, D. 1992. Jour. Ariz.-Nev. Acad. Sci. 26: 132–138). Due to the Mediterranean climate, summer rains in the California Central Valley are exceedingly rare. California winter temperatures would not permit the water in potential clam shrimp habitat to rise to a temperature appropriate for *E. texana*. Typically, Central Valley ephemeral winter pools have the Conchostracans *Cyzicus californicus* (Packard) 1883 and *Lynceus brachyurus* Müller, 1766.

The locations occupied by *E. texana* in Palo Cedro and its source of inundation

were both artificial. However, suitable artificial habitat may provide *E. texana* opportunities to expand its range into areas previously unavailable to colonization.

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